Perry (John) Captain
712 m. 57

REMARKS on the Reaſonings and different Opinions laid down in ſome late Printed Propoſals for Reſtoring the Navigation of the Ports of King's-Lynn *and* Wisbich; *and Draining of the great Levels, which have the Outfall of their Waters by the Rivers* Ouſe *and the* Nean, *thro* Mortons-Leam.

With a METHOD *humbly offered to Conſideration, for obtaining a proper Depth to both the ſaid Rivers, and for the future Effectual Draining of the Levels, thro which they have their Courſe.*

THE growing Evil State and Condition of the Harbours of *Lynn* and *Wisbich*, and other Neighbouring Ports in the ſame Bay, and the general diſtreſs'd Condition of the aboveſaid Levels, which, within late Records and Memory, I find unanimouſly agreed to be increaſed; and, no doubt, (if the ſame Cauſe may be believed liable to produce the ſame Effect) unleſs ſome effectual Meaſures be taken to prevent it, will ſtill increaſe and grow more difficult to retrieve: therefore the ſooner a Remedy is taken, the leſs will be the Expence; as well as the Benefit to the Country the ſooner be obtain'd.

IT is now near two Years ſince I was deſired to go down and view the State of the North Levels, which formerly had their Waters diſcharged by Sluices fixed in the Banks of the *Mortons-Leam* (or River.) But upon the ſaid *Leam* (or River) becoming ſilted up, which, on taking my View, I found the Bottom of the ſame to be ſeveral Foot higher than the Top of the ſaid Sluices; it therefore particularly obliged the Proprietors within Memory, to turn their Waters, which formerly had their Diſcharge by a Drain at a Sluice fix'd in the Banks of the ſaid *Leam*, ſome Miles above *Wisbich*, over againſt *Guyhorn*, and to carry them down another way, thro the Marſhes into the Shire-Drain and Out-fall at *Gunthorp* Sluice, ſome Miles below the Mouth of the ſaid *Leam* and Port of *Wisbich*; and yet have not been happy in the Effect that was hoped for by it: for the large Flat of Sand, or Mixture of reddiſh Sullage, which extends without in the Bay, being raiſed and driven by the Weight of the Waves, in hard Gales of Wind, from one Shore to another; in dry Seaſons, when there has been very little or no Run of Water to ſcour and keep open the ſame and other Sluices, the Sullage has ſubſided and choaked them up, particularly the Sluice abovementioned has for ſix or ſeven Years paſt been entirely choaked and ſilted up, thro the Unskilfulneſs in ordering and fixing the ſame. And as I did with all Truth deliver my Opinion on that Head at my Return from my ſaid View: And Works relating to the Operation of Water, having been the Buſineſs and Study of my Life, with a good deal of Experience in this particular Way; on this Occaſion, when an Affair, whereon the common Welfare of ſo great a Tract of Country depends, and the Navigation on the reſpective Rivers extending thro the ſaid Levels, is in the laſt Diſtreſs: I ſhall, Firſt, ſhew my Opinion of what I ſee imputed to be the Cauſe of the Evils complained of.

AND, Secondly, ſhall ſubmit to Judgment and Conſideration, what I believe to be the only proper Remedy for equally attaining, with the greateſt Expedition and the leaſt Expence, the Points deſired.

TO the firſt and main Point in Diſpute, I take it to be Demonſtration, That the Out-falls or Mouths of neither of the ſaid Rivers, as they are become choaked or ſilted up, has not been the Effect of a few Years, nor done by any Sullage brought down from the Country; but, in the gradual Operation of Time, raiſed and brought in from the large Flat of Sands, which are left dry by the Tides for ſeveral Miles at low Water, equally before the Mouths of the ſaid Harbours, and others ſituated in the ſame Bay; and by the Weight and Force of the heavy Waves in Gales of Wind, have been raiſed and carried by the Stream of the Flood into the Rivers, where the Water ſetting in, becoming more quiet, and Land-locked (as the Sea-Term is for it) the Sullage has ſubſided, more eſpecially in ſuch continued dry Seaſons, when the Land Waters have wanted their due Weight and Force, to ſcour and drive them back on the Return of the Ebb.

AND this is the more plain to happen, thro the want of the continued Run of Land-Waters; for that on the coming down of any Floods from the Country, the Mouths of the ſaid Harbours, or more inward Parts of their Rivers, or of any others that I know in the World, more indiſputably ſuch that are continued within the Bounds of any Channel of proportionable Breadth to the Weight of their Waters: Such Rivers, tho ſituated in the *Mediterranean* or *Baltick* Seas, where there are no Tides, as well as where there is a Flux and Reflux of the Sea, are kept deep and open by ſuch Operations. And the greater any Land-Floods are known (tho always then the Waters are more thick and muddy) the greater the Depth of ſuch Rivers are worn to and maintained.

ON the other hand, where the Land-Waters are of no great Weight and Power, or where Rivers at their Entrance are worn and increaſed in Breadth by the Rage of the Sea and Wear of their Banks, in Places where the Soil is weak; there are many Inſtances that ſuch Rivers have gradually decreaſed in their Depths, eſpecially where Sands and Sullage extend on the Coaſt: and within the late Records of Time, ſuch Rivers have been known to be choaked up, and to have loſt their Navigation, as the neighbouring Rivers of *Wisbeech* and *Spalding* may be ſaid to be very near it, and others ſituated in the ſame Bay, quite loſt; when that of *Boſton*, tho the Sands in the ſame Bay in ſtormy Weather, equally are raiſed before it, yet a greater and more conſtant Current of Water (as I am informed, and believe) ſetting out by the ſaid River, in proportion to its Breadth, that Port is always kept open, and to a tolerable Depth thereby. And as to ſuch larger Rivers in any part of the World, where the Weight of their Waters are greater, they always keep their Depth within their Banks, tho' in Places attended with Shoals, or Bars, at their Entrance, and tho' without the Aſſiſtance of any Indraught from the Tides.

IT is likewiſe as True, That in Places where there is a Flux and Reflux of the Tides, and any Receptacle and Indraught from the Sea, like that at *Yarmouth*, tho the Freſhes coming from the Country in dry Seaſons, are very inconſiderable; yet that River, ſo far as continued within Banks, in the way between the Bar at the Entrance to the Port, and the great Flat at *Braydon*, the River for that Length is ſcoured and maintained to a ſufficient Depth for the largeſt Trading Ships: Whereas, was there no ſuch Flat or open Place, but that the two Rivers, which now fall into the upper end of *Braydon*, one from *Suffolk*, and the other from *Norfolk*, were continued within their reſpective Banks, till united in one Out-fall to the Sea, without any ſuch Re-

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Receptacle in the way; I make no doubt but that Port, by reaſon of the Sands raiſed by Storms on the Coaſt, would long ſince have been choaked up by the Sullage ſetting in with the Tides, like as at *Wisbich*, &c.

THE ſame, in ſome meaſure, may be alſo obſerved at *Lynn*. A little way below, and ſome way above the Town, the River is contained within Banks of a common breadth in the Diſcharge towards the Sea, in proportion to the Run of the Waters for ſuch mentioned Length. But higher up the River above, in the way to *Germans*, is near a Mile in breadth for ſix or ſeven Miles in length; into which broad ſpace, as the ſame is now ſilted, from about the Half-Flood to the height of the Spring-Tides, there is a Body of at leaſt eight or ten Foot Depth of Water (reckoning one Place with another) now received, which on the Reflux of the Tide, for the firſt Half, or two Thirds of the Ebb, ſets out with that Weight and Power, that ſcours and maintains the Outfall from thence to the Sea, to ſome tolerable Depth. And tho this broad Space, as well as the River above, is known to have conſiderably loſt in its Depth, ſince the placing of *Denver*-Sluice; yet by the Looſeneſs of the Soil, and Weight of the Waves (in hard Gales of Wind) which in ſo open a Place run hollow and deep, and ſtrike with ſuch force againſt the Shore, that ſtill gains in breadth to that degree, that they have ſeveral times (as I am informed) within Memory, been obliged to ſhift the Walls back upon the Marſh-Land; ſo that the ſame ſtill continues to be ſuch a large Indraught and Receptacle for the Sea-Water, that the Depth at the Outfall below the Town (as I am informed by a Gentleman of *Lynn*) has not been obſerved to decreaſe for ſeveral Years paſt.

NEXT, as to what is deſcribed by the *Lynn* Caſe, to be the Cauſe of the Decreaſe in the Depth of the River above, and the Loſs and Obſtruction to the Navigation up the Country:

THE ſame is charged to be occaſioned by certain Sluices, which have been upwards of ſeventy Years paſt fixed, one near *Erith* in *Huntingtonſhire*, and the other at *Denver* in *Norfolk*, and by the cutting of the 100 Foot Drain. That by the firſt of theſe Sluices, and the ſaid Drain, that part of the Freſhes coming from the Countries of *Huntington* and *Northamptonſhire*, *&c.* have been turned from their natural Courſe, into a Channel whoſe Bottom lying higher (or dug to leſs Depth) than that of the old *Ouſe*, in their Paſſage to the Sea, on coming to be diſcharged at the lower end of the ſaid Drain, whilſt the Sluice at *Denver* was ſtanding; the Surface of the ſaid Floods ſwelling above the Height of the Waters within the ſaid Sluice, preſſed and lay againſt the ſame in ſuch nature, that often, for many Days and Weeks together, the Gates were impracticable to be opened; and the Navigation of Boats and Veſſels up the Country, at ſuch times, became ſtopped and interrupted, till ſuch Floods were run off, and became level with the Waters within the ſaid Sluice.

SECONDLY, That the Indraught of the Waters from the Sea, which formerly, before the fixing of the ſaid Sluice, extended many Miles towards *Ely*, up the *Stoak* and *Brandon*, and other Rivers above and beyond *Denver*, and uſed to return with ſuch Force and Power, that it always maintained and kept a deep Channel from thence to the Sea, eſpecially at ſuch Times and Seaſons, when the Land-Floods became united with the Spring-Tides.

BUT that by placing the ſaid Sluice, thro the want of ſuch united Scour, the Silts and Sands have ſettled, and are firmly bedded in the bottom of the *Ouſe*, from thence downwards to the Sea; at firſt equal to the height of the Sole (or Apron) of the ſaid Sluice, which was fixed eight Foot above the bottom of the River, and ſince have increaſed to a much worſe Condition.

THIRDLY, That the ſaid Sluice being blown up in the Year 1713, which gave hopes of the Amendment of the Navigation; altho for ſome time after the bedded Sands gave way, and ran equal with the Sole (or Apron) of the ſaid Sluice; yet by reaſon of the Narrowneſs and Contraction of the

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Paſſage at the Place where the ſame was fix'd; and by the want of ſuch Backwaters, which were united before the making and fixing the ſaid Works, the Sands are now become ſilted up to the depth of 10 or 12 Foot perpendicular above the Bottom of the River; and if no Remedy be found, muſt, in few Years, put a fatal Period and Termination, both to Navigation, and to Draining.

FOURTHLY, That the Evil is the more to be apprehended, for that the Freſhes deſcending from the Country, by Way of the ſaid 100 Foot Drain, have been lately obſerved inſtead of continuing on in their due Courſe to the Sea, to revert, and run back with a ſtrong Current thro' the Remains of the ſaid *Denver* Sluice, into the South Levels of the Fens, or the Arms of the Rivers thereto belonging; occaſion'd by the Bedded Sands in the *Ouſe*, at and below the End of the ſaid Drain, which lies as a Bar to the Diſcharge of ſuch Freſhes, to ſo much greater Height as before is mention'd, than formerly. And that on the Tides from the Sea, coming up and meeting the ſaid Freſhes, both together run up towards *Cambridge*, without returning back for ſeveral Days, and that thereby the Track of the River above and beyond the Sluice, Daily grows ſilted up, and will ſoon riſe to the Height with thoſe Sands towards *Lynn*, Bedded below the Sluice; and ſtill become more Deſtructive to Navigation, and the common Drain of the Levels.

IN Anſwer whereto, in a Matter which requires the utmoſt Truth to be ſought for, I ſhall, Firſt, ſhew my Reaſons wherein I either agree with, or differ in my Opinion, in the Points I find ſtated.

SECONDLY, Shall lay down, and ſubmit to Judgment, what I believe, in the Height that the Evil is now grown to, can only be proper and effectual for Attaining, as well with regard to Navigation as to Draining, the Purpoſes deſired.

CONFORMING whereto, I ſhall Firſt obſerve my Opinion, that if ſuch Drain was cut, as deſcribed, and ſuch Sluices in ſaid Places mention'd, were fix'd; particularly if that of *Denver* was ſo order'd and built, that on the coming down, and Diſcharge of the Floods by the ſaid new-made Drain, the ſame did make ſuch ſtop of Trade, by Veſſels and Boats going up, or coming down from the Country, as is deſcribed, thro' the want of Double Gates being fix'd thereto, the ſame was injudicious, and juſtly to be blamed.

FURTHER, The Deſign which I apprehend the ſaid Drain to be cut, and Sluices to be fixed for, was, for the Purpoſe and Intention, in Times of great Rains, and wet Seaſons, to carry off ſo much of the Floods coming down from the Country, above and beyond the *Hermitage* Sluice, in a ſeparate Body, and in a more ſtrait and quick Deſcent to the Sea, without the paſſing through, or over-flowing the South and Middle Levels; or the Banks of the Rivers deſcending from *Cambridge*, *Suffolk*, and *Norfolk*; by which Way all the united Waters formerly took their Courſe; and by the Length of the Way, and low-part of the ſaid Levels, thro' which they ran, muſt thereby have ſubjected them to the greater Diſtreſs, thro' the want of more immediate Deſcent, and been ſlow and tedious in their Diſcharge; as may be thus explain'd.

IF the Length of the ſaid Drain be reckon'd twenty Miles, and the Length of the *Ouſe* round by *Ely* forty Miles, ſuppoſing the preſent Deſcent or Difference of Level from the upper end of the ſaid Drain at the *Hermitage* Sluice to the lower end at *Denver*, to be in the whole four Foot, or to every ten Miles one Foot (tho' as the Sands now lie bedded in the River, I do not believe the Deſcent to be ſo much) the ſame Deſcent then in the longer way round by *Ely*, can to every ten Miles be no more than ſix Inches; conſequently the Velocity of the Stream can be but with half the Force: and as the Length of the Run is double, ſo the Time required for carrying off the Waters this way, muſt be at leaſt four times what is required by way of the Hundred-foot Drain. And the ſame Proportion in the Difference of the Diſcharge of any Waters muſt happen, ſuppoſing the Sands bedded in the River to be 6 or 8 Foot deepen'd.

AND tho' ſuch Floods, or Freſhes from the Country beyond the *Hermitage*, do now on the coming down to the lower-end of the ſaid Drain (ſome part thereof) ſet into the ſaid Levels, ſince the *Denver*-Sluice has been tore away, and lies open, occaſion'd, in a great meaſure, by the Height the Sands are bedded up to in the River : Yet as the Deſcent from the End of the ſaid Drain to the Sea, is far greater than the Deſcent can be ſuppoſed for the Run of any Water back towards *Ely* ; and as the Paſſage at *Denver* is much narrower than the Breadth of the River downwards ; and that the Freſhes are only met and ſtagnated on the Height of the Spring-Tides ; I therefore conceive, that much the greateſt Part of the Freſhes coming down by way of the ſaid Drain, have been carried, and do ſtill run directly to the Sea, ſince the ſaid Sluice has been blown away.

WHEREAS were there no ſuch ſeparate Drain cut, nor no ſuch Sluice at *Hermitage* fix'd, the whole Waters, occaſion'd by the Rains beyond the ſame, muſt run into, and ſwell the reſpective Rivers, and Low-lands of the South Levels, and be united in one Body, with the Rains and Floods on that ſide the County ; and in the running off, conſequently muſt ſubject the Low-Levels of the Fens, in the Way by *Ely*, to the greater Diſtreſs, by the Slowneſs of the Motion, and Lateneſs in Time of the Diſcharge, before-ſhewn.

SO far I apprehend to have been the Intention and Uſe of the ſaid Drain ; which, had the *Denver* Sluice been made and fixed in a proper Manner, muſt always have had a good Effect, as I ſhall hereafter more particularly ſhew my Reaſons for my Opinion.

BUT, if at ſuch Times and Seaſons, whilſt the ſaid Sluice ſtood, when ſuch Freſhes, or Floods, coming down by the ſaid Drain, were ſo far run off, and diſcharged, that the Surface of the Waters, at the lower-end of the ſaid Drain, became equal with, or in the leaſt Degree below the Waters of the South Levels, within the ſaid Sluice : If then, the ſame was not fixed to ſuch proper Depth, and ſuch ſufficient Dimenſions, as to give full and free Diſcharge to ſuch Part of all Rains and Floods, coming down from the ſeveral Rivers above, and within the ſaid Sluice : And alſo, if the ſame was not made and fixed with proper Draw-Doors, *&c.* ſo as after the coming down of any Land-floods from the Country, on the common Run of the Land-Waters ; and in dry Seaſons, to pen up, and let off ſuch repeated Weight, and Heads of Water, from Time to Time, on the laſt Part of the Ebb, as to ſcour and drive away all ſuch Sands and Sullage, brought in by the Tides, or otherwiſe ; then, indeed, ſuch Sluice, fix'd only to ſtop and prevent the Waters on coming down the 100 Foot Drain, from running back into the South Levels, and to ſtop and keep out the Tides ; without the being made for the Conveniences and Purpoſes as above, muſt very much have contributed to the Settling and Bedding of the Sands, from thence to the Sea, and all the Evils which are felt and complain'd of thereby.

SECONDLY, As to what is ſaid of the ſeeming Amendment of the Navigation, and Satisfaction expected upon the ſaid Sluice being firſt blown up ; I conceive it to be plain, that the Wear by the Indraught, on the Height of the Spring-Tides, did, on the ſaid Accident firſt happening, mend the Depth of the Channel, ſome way below the ſame ; for that the Sands before the ſaid Sluice was blown away, lying (as by the *Lynn* Caſe is conceiv'd) on a Deſcent to the Sea, higheſt at the End next the Sluice, gave the Spring-Tides, on ſetting up into the Arms of the Rivers beyond the ſaid Sluice, an Opportunity, with a very eaſy Operation (as the Sands lay in the Poſition aforeſaid) to rub and wear them down, when the Sluice was gone, and did, no doubt, carry forward, and lodge ſome part thereof in the Depth of the River, next immediately above and beyond the ſaid Sluice. But after ſuch Accident and Operation, the Sands becoming ſoon upon one fair Bottom above and below the Place where the ſame was fixed, (tho' lying, perhaps, ſomewhat higheſt at, or not far below the Remains of the ſame:) Since which Time, by new Sands ſtill brought from the Sea (or Part from the Sea, and Part from the great Breadth the *Ouſe* is worn to below *Germans*) and ſubſiding ſo far as the Tides extend with any Run of their Current up the Country, in the way from the Sea, notwithſtanding any Aſſiſtance of any uſual Wear by the Freſhes, is ſtill become more ſilted up.

SO that tho it be admitted, had the Indraught of the Tides never been obſtructed, the Navigation, in the way to *Ely*, and Rivers above, would in ſome meaſure have been to this time better preſerved; yet there has been another undeniable Cauſe, in my Opinion, which I ſhall hereafter obſerve, that hath contributed to the choaking up of the River, beſides ſuch want of Indraught towards *Ely*. And by reaſon of the height, the Sands are bedded up in ſo great a Length of the River, below the end of the ſaid Drain and Sluice, and ſome way too within and beyond the Remains of the ſame; I take it to be equally certain, that the Evil is grown now ſo ſtrong, as not to be removed without ſome more effectual Power, than can by any means be hoped to be found, either from the bare natural Help of the Freſhes, or of the Tides, were all now to be ſet open, as in former Days. And the Reaſons for my Opinion in this Point, are as follow:

FIRST, As to any Help that can be hoped from any Indraught from the Sea, I am informed, from Obſervations made in *Auguſt* laſt, That the Depth of the united Waters from the Country, on coming into the *Ouſe* at the end and below the 100 Foot Drain, was not above eight Inches, or a Foot in depth, at the moſt, on the Neap-Tides, which did not reach up to the ſaid Drain by ſome Miles; and that the Spring-Tides meeting the Country Waters, only riſe and ſwell'd the River at that Place about three Foot, or little more, in paſſing towards *Ely*. So that hereby I would obſerve, that the Indraught of the Water from the Sea ſetting into the ſaid Levels in a dry Seaſon, at the Spring-Tides, was but very inconſiderable, and at the Neap-Tides not any thing.

WHEREAS by the Account of the State of the River formerly, the Indraught had at leaſt twelve Foot greater Weight and Depth than at preſent (computed from the height the Sands are now raiſed to) and conſequently may then be ſuppoſed to have ſet in and out at leaſt from the firſt Quarter of the Flood till the laſt of the Ebb: Whereas, according to the above Account, the Indraught on the Spring-Tides in dry Seaſons, when there is moſt occaſion for a Scour, can now only be ſuppoſed to ſet up beyond *Denver* towards *Ely* at (or near) the Top of high Water, with ſome Deſcent of Current; and on the Reflux can only be conſider'd to ſettle down with the Ebb, until becoming level with the Surface of the Waters above in the Levels, and then return back in a very thin and ſlender Weight to the Sea, the Sullage, at the Time of the ſaid Slack and Stillneſs at and after high Water, ſubſiding and increaſing in the height.

SECONDLY, As to the Power of any Scour that can now be ſuppoſed to operate by Freſhes from the Country, ſuppoſing the ſame Body of Waters united by Rains to come down by way of the ſeveral Rivers, as in Times paſt; yet by reaſon of the height which the Body of Sands, bedded for ſo many Miles in Length above the common Outfall of the *Ouſe*, are now grown up to, and ſettled above the old Bottom of the River, any Floods whatever that can now be ſuppoſed to deſcend in the reſpective Channels from whence they derive, thro a low flat Country, having actually loſt ſo much of their Deſcent in their way, as the *Ouſe* is now choaked below the end of the ſaid Drain, muſt thereby loſe ſo much of the Velocity of their Current, and conſequently ſwell high on all the Banks of the Levels (or the Rivers in the

Levels) in the way from *Ely*, before they come to have any Depth over the ſaid Bar from thence to the Sea, and can only run off in a lingring tedious Diſcharge, with very little Force in Weight and Power to grind down the Sands in any degree, like to what is deſcribed to have been the Weight of the Indraught and united Scour a hundred Years ſince.

THIRDLY, Another Cauſe which I reckon to have very much contributed to the ſettling and bedding of the Sands to the Extent in Length before mentioned above in the River, and that may alſo be preſumed very much to obſtruct any Means now practicable to be uſed in procuring the antient Depth of the Outfall to the Sea, is the great Flat of Sands, in the broad Space I have already made ſome mention of, below in the River between *Germans* and *Lynn*; which Place, as is found to be the Effect in all Rivers that I have obſerved, whether at their Mouths near to the Sea, or within any Country by the Weakneſs of the Soil or otherwiſe, where the Banks wear in the Breadth, or are divided by Iſlands, like as the *Nile* and the *Wolga*, conſequently loſe in the Depth. And it being affirmed that the Breadth of the aforeſaid broad Space in the *Ouſe*, is increaſed within Memory, and continues ſtill to wear, it ſeems very reaſonable then to believe, that all the Sullage that hath been ſo worn, has not been wholly carry'd by the Ebb, and lodged in the Sea, ſo as not to come back from thence; but has been carried upwards too in hard Weather, and helped to choak the River for all the Length in the narrow Parts above, from *Germans* beyond *Denver*, where the Banks being more firm, are reckon'd but 150, or not more than 200 Feet in the Breadth, from one Side to the other. So that in caſe of any Floods or Scour, which may be ſuppoſed to have Power and Weight ſufficient, whereby to procure a good Depth for ſuch Length and Space where the River is narrow: Yet on the coming down to be diſcharged over ſuch broad Flat, muſt there be ſuppoſed to ſpread thin in the running off, and loſe in its Weight, in ſcouring down the neceſſary Depth, unleſs confined to ſome narrower Bounds, and conſequently muſt remain as a Bar to deepening the River above.

HAVING thus laid down my Opinion of the Cauſes from whence I conceive the Annoyance to the ſeveral Ports in the Bay, and the long diſtreſſed Condition of the Levels hath proceeded; and particularly the Improbability of ever procuring any proper Depth to the Out-fall of the *Ouſe*, as deſired by any Rules or Methods which have hitherto been practiſed or propoſed:

I Shall now proceed to lay down, according to my Promiſe, a Method humbly ſubmitted to Conſideration, both for the general Draining of the Levels, and reſtoring and maintaining a proper Depth to the *Ouſe*, and River of *Wisbich*, ſo as to be depended to laſt and endure to future Ages.

IN order whereto, to avoid the Flat before mentioned, I propoſe either that the Run of the River be confined by ſome artificial Work cloſe down by the *Norfolk* Shore; or that a Canal be cut from the narrow Part of the River below *Germans*, as I ſee laid down by a Plan of the River, on a fair Line towards the Sea, and at the upper end of the ſaid Canal, to fix a large Sluice with proper Gates, for the Navigation of Veſſels up the Country; as likewiſe to be made with Draw-Doors, ſuch as I made at *Dagenham*-Breach, to be fixed to the Low-Water Mark, or near it; and the Foundation to be ſecured by a Drift of Dove-tail Piles, and the Wharfs or Sides built with Tarras and Stone for Duration. A ſecond alſo of like nature to be fixed about the half way (or more than the half way) between that and the late *Denver* Sluice; and a third at ſome Place beyond the ſaid Sluice, where a good depth of Water, not ſilted up, is now to be found, without occaſion for any Scour, but by Floods from the Country, further or beyond it to be made.

BY theſe Sluices to be thus fixed, I propoſe to ſcour and deepen the River and Harbour, to whatever Depth ſhall be deſired, from the uppermoſt of them, down to the Low-water Mark in the Sea.

WHEN the firſt Sluice is fixed, and the Canal dug down to as good a Depth, as can conveniently be done by the Hands of Men, as the Nature of the Ground, and the Annoyance of Springs will permit; then the Canal is to be laid open, and the Earth dug to what farther Depth ſhall be needful, to be partly laden into Barges, and carried to the making a Dam croſs the preſent River, at the upper-end of the ſaid Canal, for penning up ſuch Heads of Water, as ſhall be neceſſary to ſcour and deepen the Canal, and the Length from thence to the Sea. Another Dam, alſo, is propoſed to be made a-croſs the *Ouſe*, at the lower-end of the Canal, only to ſuch needful Height, as on the letting off ſuch Scours, as ſhall be neceſſary from the firſt, and other Sluices, to prevent any of the Waters from ſetting upwards into the Broad-place of the *Ouſe*, before-mention'd, which otherwiſe would loſe, and take off part of the Weight and Force in the Operation of grinding down the Sands in the Way to the Sea.

AND for the better Effect, alſo, in letting off ſuch Scours, as ſhall be neceſſary by any of the ſaid Sluices, preferable to any other ſort of Scours which are before treated of; all ſuch Heads of Water whatever, which are propoſed to be pent up, and let off, the laſt Part of the Tide is to be choſen for it, whereby to take the greater Power. And as well in the Practice of firſt Deepning the Harbour (as on any Occaſion afterwards) ſome Time before any Scour is let off, when the Bottom of the River, or Sands, in the Way to the Sea, appear dry, Men are to be employ'd to dig and looſen ſuch Points, and Parts of Sands, and Places, as ſhall be found proper, and with little Labour can be done.

WHEREAS natural Indraughts from the Sea, ſuch as have been before ſpoken of, cannot be ſuppoſed to be of equal Advantage in Places once choak'd and ſilted up to any Degree like the *Ouſe*, and *Morton's Leam*; on this Account, that ſuch In-draught that ſets into any Receptacle, only at the Laſt of the Tide, or ſuppoſing it to be at the ſecond or third Quarter of the Flood, the Water can only ſet out again with its full Force, at the ſame, or not long after the ſame equal Times of the Reflux. So that when the Waters are low in the Sea, and the Sands and Sullage, without in the Bay, begin to appear dry, the Waters then ebbing off but thin from the River, may, in dry Seaſons, be eſteem'd only to ſettle down with the Ebb, and then when there is the utmoſt Occaſion, conſequently can grind but with very little Power.

BUT, by the proper Uſe of Sluices, on any Head of Water, to be either borrow'd from the Sea in dry Seaſons, or in the Time of the common Run of Freſhes from the Waters of the Country, being propos'd to be wholly kept pent up, until the Sands, without in the Bay, and the Bottom of the River, ſhall appear dry, and firſt to be looſen'd by the Hands of Men, as any Occaſion appears for it, and then let off on the laſt Part of the Ebb with its full Weight and Power, as often as ſhall be ſeen neceſſary, cannot fail, in my Opinion, of a much better Operation.

AGAIN, in caſe of natural Floods coming down from the Country, which, on every Return of the Ebb, run ſtrong, and grind with their full Force, to the Time of Low-water; yet it is the Unhappineſs they come but ſeldom, and therefore cannot be reckon'd of equal Advantage with ſuch artificial Scours. Beſides, the natural Floods, when they come down, take and carry their Power over the Flats and Sands, without in the Bay, both before *Wisbich*, and *Lynn*, as directed by Storms, or otherwiſe, and do not admit of being guided by the Hands of Men; from which ſingle Advantage it may be hoped, a more certain Channel, in ſome Meaſure, may be found for the future, as far as the Sands ebb dry at Low-water) for the Pilotting of Ships over ſuch Flats, than hitherto hath been.

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IN the propos'd Practice of thus Deepning the Harbour by Sluices, it will be proper to begin to ſcour firſt with the two outwardmoſt of them ; and either upon the borrowing any Head, or repeated Heads of Water, from the Sea, in dry Seaſons, and in fair Weather, when the Sands in the Bay are not diſturb'd and rais'd by Gales of Wind, ſo as to be brought in by the Tides, or in the common Run of Land-waters, when in one, or in the Time of two or three Days, or more, any Head of Water can be pent up. In which laſt mention'd Caſe, when it ſo happens, that the Waters in the Arms of the Rivers, in the South Levels, are lower than thoſe coming down by the 100 Foot Drain ; then, on the penning up any Head of Water, at the lower, or at the middle Sluice, the Sluice placed beyond *Denver* muſt be kept ſhut, as well for the Advantage of making ſuch Scour, which, otherwiſe, on attempting to raiſe any Head of Water, coming by Way of the 100 Foot Drain, would partly be loſt, by running into the ſaid Levels ; as alſo, to prevent any Detriment to thoſe Levels, whoſe Surface and Banks are taken to lie lower than thoſe more towards *Lynn*.

AND after having made and ſcoured ſome Feet better Depth from the ſaid two lowermoſt Sluices towards the Sea ; then, alſo, for the procuring a better Depth in the Way from the uppermoſt Sluice down to the ſecond, by reaſon it is conceiv'd, that any Head of Water, pent up by the upper Sluice, to a ſufficient height in the Summer-ſeaſon, for Expedition in deepening the ſame, would overflow, or ſwell ſo high, as to be detrimental to the Levels above ; therefore, in the Practice of deepening the ſame, for the Length between the ſaid two Sluices ;

IT is propoſed, that the Summer-ſeaſon, in the want of Freſhes, be taken for it, and that a Stop be made at the upper-end of the 100 Foot Drain, for the turning the Waters, which come down from beyond *Erith* into the old *Ouſe*, by way of the *Hermitage* Sluice ; and on the Reflux of the Tides upon the Waters being ebbed off in the Sea, below the Levels, or Height which the Sands are bedded up to in the Bottom of the River :

THAT then the upper Sluice, placed beyond *Denver*, be kept ſhut, during ſuch Times of the Tide, aforeſaid ; and that Men be employ'd in the length of the Way between the old Foundation of the *Denver*, and the ſecond new Sluice, to dig up, and remove the Sands and Sullage to the depth of about two or three Foot, (more or leſs, as found Occaſion) partly to be wheeled by Barrows directly over the Banks, and part laden into flat-bottom'd Veſſels, and to be diſpoſed of, or unladen, as ſhall be ſeen moſt convenient, and of the leaſt Expence, beginning firſt at the outwardmoſt, and next to the Sea. And on coming up to the Remains of *Denver* Sluice, then to break up, and take away the Bottom thereof, and to deepen and widen the Paſſage as ſhall be ſeen neceſſary. As alſo, then to dig and remove the Sands and Sullage to the like Depth aforeſaid, towards the upper Sluice.

AND when the Sullage between the ſaid two uppermoſt Sluices is once ſo far deepen'd by the Hands of Men, the reſt, by the Weight of ſuch repeated Scours as practicable to be made, without Annoyance to the Levels, will be perfected with the leſs Difficulty ; Drag-Harrows, and other Means alſo to be uſed.

AND as to ſuch Sullage that ſhall at any time be found to lodge between the lowermoſt and ſecond Sluice, by the borrowing of Waters in dry Seaſons from the Sea : The ſame will afterwards be eaſy to be ſcoured away by a Head of Water from the ſecond, in the time of the common Run of the Freſhes, to be pent up for it ; or, in the like Caſe, to ſcour by the upper Sluice, in the time of ſuch Freſhes, all Sullage lodg'd in the Way from thence to the ſecond, and never to admit any Sea-water to paſs, or carry Sullage beyond the ſame. But it is further to be obſerved, that in caſe the ſaid upper Sluice be found neceſſary to be fixed beyond the River *Stoak*, then a low Sluice muſt, for preventing any Head of Water, when let off, from running up the ſaid River, be fixed at the Mouth of the ſame.

THUS having laid down what is propoſed for procuring ſuch Depth and Advantage to the Navigation of *Lynn*, as deſired; and the like being equally practicable for reſtoring the Navigation of *Wisbich*:

I ſhall now ſhew, and explain how the whole Fens, and Levels, belonging to the Extent of Country, thro' which the *Ouſe*, and the River of *Wisbich*, have their Courſe, may, by the Uſe of ſuch Sluices, be depended to be effectually drained, and rendred of Value to the reſpective Proprietors, the loweſt part of them.

AS alſo, now I am treating of this Method (which, perhaps, I may not have another Opportunity of doing) ſhall make a ſhort mention of ſome other Places which are equally capable of Improvement to the publick, as well as private Benefit thereby. And,

FIRST, as to the Practice of Draining the reſpective Levels by the *Ouſe*, and the *Nean*, or *Morton's-Leam*.

IT may be obſerv'd in the River of *Thames*, in dry Seaſons, when the Stream of the Ebb is not augmented by the coming down of Freſhes, on ſuch Spring-Tide, when it flows 20 Foot upright at *Graveſend*, it flows then 15 (or thereabout) at *London-bridge*; which is accounted 20 Miles, as the River runs, but is really more than that Diſtance. And it being remarkable at *Woolwich*, or elſewhere, that the Stream of the Ebb ſets ſtronger down than the Flood ſets up; by which Obſervation I form my Judgment, that the difference of Level between one Place and the other, as the Tide ſets up the River, is about two Foot, or better; and the Difference upon the Ebb, as the Current on the laſt of the Tide ſets down the River, about three Foot; making in all the five Foot abovemention'd.

BY this I would make a Compariſon at *Lynn*. When a Spring-Tide happens to flow 20 Foot perpendicular, at the Keys of the Town; it then, as I am informed, by Obſervations made the laſt Summer, flow'd only three Foot perpendicular, or but little more, at the lower-end of the 100 Foot Drain; and reckoning the Diſtance of the ſaid two Places, one from the other, to be 20 Miles, or ſcarce ſo much, the Deſcent, or Difference of Level in the Run of the Flood for the ſaid Length, may be reckon'd two Foot, or thereabouts; and allowing it to have flow'd upright full three Foot at the Place aforeſaid, then there will ſtill remain 15 Feet difference of Level, or near it, between the Height of the Surface of the Freſh-water coming down the *Ouſe*, at the lower-end of the 100 Foot Drain, and the Surface of the Sea-water at *Lynn*, on the laſt part of the Ebb. And being likewiſe inform'd, that the Depth of the running Waters from the Country, at the End of the ſaid Drain, on the Neap-tide, was no more, or not ſo much as one Foot:

CONSEQUENTLY, then, the higheſt part of the Sands and Sullage, bedded up in the River at the ſaid Place, muſt be about 14 Feet perpendicular Height above the Surface of the Low-water at *Lynn*. And according, alſo, to my Information, more towards *Ely*, as the River is there not ſilted up, the Water is found gradually deeper; and at ſome Miles diſtance, in the dryeſt Seaſon, is about ſix or ſeven Foot in depth, more or leſs; excepting in ſuch particular Places where Gravel has been laid for Fording over the River, the Water being not practicable to be drawn lower, but is pent up, and ſtagnated in all the Branches of the Rivers in the Levels above, by means of the Bar of Sands and Sullage, in the way to the Sea.

THAT alſo the Waters being ſo ſtagnated, are at the dryeſt Seaſon of the Year about four or five Foot (more or leſs height, as the Ground is uneven) above the common Surface of great part of the Middle and South Levels, which have been conſtantly cover'd with Water, unleſs in ſuch Places which have in the Summer Seaſon, in ſome degree, been drained by Mill-Work, and by the Exhalations of the Sun.

HOW the ſaid Bar of Sands, which have thus pent up the Water, ſhall be ſcoured down for the Length that the Sluices are placed, is already ſhewn, and how the Sullage and Gravel in ſuch particular Places where needful, ſhall be cleanſed, and the Waters from the Rivers above ſhall be more expeditiouſly and effectually drained off, and kept down below the Surface of the ſaid drowned Levels, than is poſſible to be done without the Uſe of one or more Sluices; I ſhall endeavour further to explain.

IT has been before taken notice, That in a dry Seaſon, and on the Neap Tides, which did not flow up to the end of the 100 Foot Drain, the united Waters, deſcending from the Country, did not in the ſaid Place run off above the Depth of eight Inches or a Foot. Suppoſing then the River, the whole way from the upper Sluice, to be cleans'd to the Depth that has been deſcribed; and that no Tides at all were to meet and interrupt the Freſhes, or to ſwell and augment the height of the Waters on the Banks in the Rivers above, I conſequently apprehend that the like Depth of the Waters, deſcending from the Country in a like dry Seaſon, would equally (or near it) be found in one Place as in another, in the Length to the Sea, ſo far as the River ſhall be cleans'd, and give opportunity to drain the Surface of the Levels with the ſame equal Advantage in the ready Diſcharge of all Land-Floods.

BUT whereas, after the River ſhall be deepen'd as propoſed, in caſe of the Tides being admitted to ſet up into the Levels, the ſame muſt be ſuppoſed in a great meaſure to interrupt and keep up the height of the Freſhes on the Banks of the Rivers; therefore all the ſaid Sluices are to be ſo fixed, as to ſtand wholly open upon every Ebb and Time that the Surface of the Sea-Waters are in the leaſt degree lower than the Waters within the Sluice, whereby, as much as poſſible, to give a free Diſcharge to all Land-Floods.

AND that the Tides may never come up to ſwell the Waters on the Banks of River beyond the upper Sluice, the ſame muſt be ſo made, as to ſhut too at all ſuch times of the Tides, when the Surface of the Waters in the Sea riſe or ſwell the leaſt degree higher than the Surface of the Floods, or Freſhes from the Country.

BY which means, all Floods and Rains from the Country, cannot fail of the Operation of being drain'd and tapp'd off much ſooner and lower than poſſible to be any way effected, were the Tides to have the free Admittance of ſetting into the Arms of the Rivers above and beyond the ſame.

FOR admitting the Suppoſition of the *Ouſe* being reſtored to its former Depth, and no ſuch Sluices to be placed, as now propos'd, ſo much Sea-Water as in ſuch Caſe muſt be admitted to paſs into the Levels, above and beyond the 100 Foot Drain, on the laſt half of the Flood, and on the Riſe of the Spring-Tides, the ſame (or like) Quantity muſt firſt again ſet back, and have time to be re-diſcharged, before any part of the Body of natural Waters from the Country, in ſuch ſuppoſed Caſe, could poſſibly have their Turn to be drawn off.

BUT by the not admitting any Sea-Water at all to paſs upwards into the Levels, all the time that the Sea-Waters ſwell and preſs againſt the Gates, on the Outſide, the Waters on the Inſide muſt be ſuppoſed to be drawing down from the Country, and to gather head and riſe on the Inſide of the Gates; and upon the Waters of the Sea again ebbing below the Surface of thoſe in the Levels above, they muſt begin and continue to ſet out with their full Force, until met and ſtopt again by the Tide of Flood, cannot fail of a more effectual Diſcharge.

FOR if it be true, That the Water did not run at the lower end of the Drain aforeſaid above eight Inches, or a Foot in Depth, on the Time of the Ebb at Sea in *Auguſt* laſt, it may then (the Waters being conceived to be but narrow at that Depth) reaſonably be ſuppoſed to ſet out with more than ten times that Body, and yet not riſe high on the Banks, when the River ſhall be deepen'd. And tho but an Inch, or a Hand's Breadth of the Surface of the

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Waters of the Levels, be ſuppoſed, in time of Rains, to be drawn off upon one Tide lower than the Tide before-going, the ſame Advantage will follow the next Tide, and ſo on, till coming down to leſs Depth, according to the abating or increaſing of the Freſhes from the Country; and in moderate Rains, and in the ordinary Summer Seaſons, muſt carry great Demonſtration of good Succeſs, both to draining the Levels, and give opportunity to cleanſe the Shoals above:

WHEREAS, in caſe of the Tides having their free Admittance to paſs further up into the Country, the Quantity always brought in by the Flood would riſe near to the ſame height in a dry as in an ordinary wet Seaſon; and by being conſtantly repeated, would thereby keep up the Body of Waters above, and muſt retard the being drawn near ſo low, as when the Tides are kept out. Which Practice propoſed for deepening the *Ouſe*, and drawing off the Waters from the Levels, thro which that River has its Courſe, by the like Method, will carry the ſame Reaſon of Succeſs for draining the Levels by way of the *Mortons-Leam*; the Depth to the Sea to be continued down by the end of the Shire Drain: And as the Waters ſhall be kept drained from off the Surface, the Land will not only become valuable, but it is hoped the Inhabitants of the Country be more happy in the Enjoyment of their Health thereby.

AND in caſe there be any particular low part of the ſaid Levels, (like that of *Soham-Meer*) that will not admit of being drawn off by means as above is deſcribed, I am ready to ſhew an Experiment, how by ſuch Sort of Engine, as is mentioned in my Book of *Ruſſia* (Page 11.) any Water that requires to be raiſed but to a ſmall height, ſhall much more expeditiouſly and effectually be drained, than by any Mill-Work hitherto uſed, and with leſs Expence.

I Shall now ſpeak of ſome other Places on the *Britiſh* Coaſt, alſo practicable to be improved by the Uſe of Sluices.

THE firſt of which is the neighbouring Port of *Yarmouth*, at which Place the Indraught is far greater in proportion one to the other, than can be ſuppoſed to happen either by any Flux of the Tide above the 100 Foot Drain on the *Ouſe*, or above *Wisbich* on the *Nean* (or *Mortons-Leam*) and where ſome thouſand Acres of low Land are rendred in a conſiderable degree uſeleſs, occaſioned by the flowing of the Tides, and not practicable, as I apprehend, ever to be drained, unleſs by a Sluice being placed partly for that purpoſe, and partly for the more effectual ſcouring the Bar at the Entrance.

FOR the Waters from the Sea upon every Flood ſetting into the Receptacle of *Braydon*, thereby ſwell and ſtill keep up the height in the Arms of the ſeveral Rivers that fall into *Braydon*, even in the dryeſt Seaſons, on the common Flux and Reflux of the Sea; and never ſet back again, ſo as to drain the ſaid Rivers the Extent of ſeveral Miles up the Country.

WHEREAS, was a Sluice placed juſt below the Mouth of the River, which falls into the *Yare*, by the North End of the Town, to be kept ſhut on the Tides meeting of the Freſhes, and to draw off the Waters with Force on the laſt part of the Ebb:

THE ſame would firſt have both the Effect of draining the Rivers above in the ordinary Seaſons of the Year, to whatever Depth ſeen neceſſary, and would alſo carry with it the Demonſtration of more expeditiouſly drawing off the Floods in any time of great Rains, when all Gates and Doors ſhall be ſet open for that purpoſe on the Ebb, and not any Sea-Waters on the height of the Tides at all be admitted to raiſe and ſwell the Surface of the common Receptacle of *Braydon*.

AND as leſs Quantity of Waters, in caſe of ſuch Sluice being fixed, would be received within the Piers by the Tides, ſo conſequently the leſs Quantity of Sands in ſtormy Weather would likewiſe ſet in; and by letting

off

off ſuch Heads of Water, as after hard Weather any Occaſion ſhall be ſeen, with full Force on the laſt of the Ebb, would be a means of obtaining a better Depth upon the Bar, with ſome further artificial Help, at needful Times to be uſed, to carry the Force of the Stream quite thro the Bar.

AND inaſmuch as one Objection remains to the keeping down the Surface of the Waters in the Receptacle of *Braydon*, namely, that thereby the Navigation of Veſſels to *Norwich* would be obſtructed; I did, in Company with ſeveral Gentlemen, ſound the Shoals over *Braydon*, on the making of my late View, and, as I then mentioned, am ready (on the Conditions which I offered in my Report) to explain a Method, whereby a ſufficient Depth may be made over the ſaid Flat within a reaſonable Expence; and if ever a Sluice ſhall be agreed to be fixed as aforeſaid, the Conſequence will follow, that not any Sullage can afterwards be brought in from the Sea, to ſubſide and choak up the way any more.

THESE Places I have been full in my Deſcription of, by reaſon of the different Circumſtances that attend the ſame. And tho' this particular Method, both by the Owners of the ſeveral adjacent Levels, and the Town, was unanimouſly approved of, and an Act of Parliament did paſs the laſt Seſſions for reſtoring the Harbour of *Rye* to its antient Goodneſs by the Uſe of Sluices; yet I do not know that any Inſtance hath hitherto been experimented or ſhewn in this Kingdom, of ſuch Effects as I have here propoſed, and laid down my Opinion of the Operation that may be expected: I cannot but be of Opinion, that ſuch has been thought of, and intended; but the reaſon why I believe any due Succeſs has not been obtained, has been the evident Defect in the fixing the Sluices.

FOR inſtance, I was informed when I was at *Wisbich*, That a large Sluice was fixed there at a Place call'd the *Horſeſhoe*, ſome little way below the Town, near eighty Years ſince, at a great Expence; which Sluice I cannot but imagine muſt have been fixed with ſome Intention to ſcour the Sands from before the Harbour, but thro ſome Defect in the Workmanſhip, the ſame was within a few Weeks, or Months after finiſhed, blown up and deſtroyed; and I was ſhewn ſeveral Materials of the ſaid Sluice, that are now employed in other Buildings.

I Was likewiſe there informed, That the Sluice fixed at *Gunthorp*, for the Drain of the North Levels, tho the ſame, as well as that of *Denver* on the *Ouſe*, had never any Draw-Doors fixed for penning up and letting off any Weight and Scour of Water in ſuch manner as I have here propoſed; yet the ſame has been twice blown up within Memory of Men now living, and according to the ſtricteſt Enquiry which I made of the Perſons acquainted with the fixing of the ſame, as it now ſtands, there are no Dove-tail Piles driven with any Engine to ſecure the Foundation.

LIKEWISE one of my Aſſiſtants, which I employ'd at the Breach in the *Thames*, taking up the Foundation of a Sluice the laſt Summer at *Scotch Flat* near *Rye*, fixed for the Drain of the Land-Waters; it appeared that the Method that had been taken in building the ſame for ſecuring the Foundation, or Apron at the Fall, was only by driving ſome ſhort Pieces of 2 Inch Plank indented into the Sides of each other, and very unskilfully ſharpen'd or pointed at the Ends: One of which Piles I have now by me in *London*.

ALSO, laying dry the Foundation of a Sluice laſt Summer, at *Dover*, built with Stone, there was found only ſome ſhort ſquare-edg'd Oak-plank, not an Inch and a half thick, driven or plac'd where Swinging-Gates had been fix'd, without being at all Grooved or Indented into the Sides of each other; ſo that the Water found its Paſſage underneath, and broke and ſpoiled the Foundation, or Apron, where the ſaid Gates had been fix'd, before the Memory of any Perſon that could give an Account of it. Upon this Apron, which was made with Stone, there had been afterwards another fixed with Wood, for placing of Draw-Doors, at ſome Diſtance from the Place of the

Swinging-Gates; and at the Place of the Draw-Doors, it appear'd the Water had alſo penetrated through the Stone-Work, and under the Floor of Wood, and the ſaid Sluice had not been uſed upwards of twelve Years: And the other Sluices made in the Croſs-Wall, not Thirty Years ſince, being alſo very defective; therefore, in the Repair of the ſame, for penning up a Head of Water, to aſſiſt in ſcouring the Beach from before the Entrance to the Harbour, there was a Neceſſity to break up the upper Apron of Wood, and to cut down thro' that of Stone, and to drive Dove-tail Piles into a Groove, made in the Chalk, (which is the natural Foundation where the ſame is fix'd) quite a-croſs the ſaid Sluice, from one Side or Wharfe to the other, which, ſo far, has anſwer'd in the effectual ſecuring the ſame.

I have in my Account of ſtopping *Dagenham* Breach, ſhewn the Occaſion of that conſiderable Accident, and others in the Banks of the *Thames*, to have happen'd purely by the ill Workmanſhip and Defect in fixing of Sluices: And have therein humbly propoſed, (for the better ſecuring the Navigation of the *Thames*) a Law to be made, to prevent any like Misfortune. I have alſo ſhewn, that thro' the Defect of the Sluices made by Mr. *Boſwell*, the Water had gain'd a free Paſſage both underneath the Bottom, and on the Sides of them, (before he left off his Undertaking) by the Tides ſetting in and out of the Levels; tho' he never made any Cloſe of the Breach, to cauſe any Head, or Weight of Water to lie againſt them. And it ſtrongly appears, both by the Depoſitions of Colonel *Joſeph Bennett*, who was well acquainted with the Place, and Nature of all the Works made there, and of many other Witneſſes in the Rolls of *Chancery*, that the Gates of each, and the Apron of one of them, being torn quite up, and blown away; the Water afterwards ſet in and out thro' them on the bare Earth: That they were ſo far from being of any Uſe or Benefit to me, in the carrying on my Undertaking, that on the contrary I was obliged to be at a conſiderable Expence, to ſtop them up, by making Dams between them and the Levels, before I rais'd my Works in the Breach; or otherwiſe two new Breaches muſt have happen'd where they were fix'd; the Remains of which are to be ſeen at this Day.

THESE Inſtances I thought neceſſary to mention, and ſubmit to Judgment what has been the Cauſe that Sluices have not hitherto produced the Advantages and Benefits above propoſed. I ſhall now name another Place or two, on the Coaſt, which in my humble Opinion, are capable of being render'd of Service to the Publick, by the Uſe of Sluices.

THE firſt of which is the Haven of *Sandwich*, where trading Ships of Burthen, might commodiouſly be Harbour'd, and ſecur'd in the Winter-Seaſon, from that known Diſtreſs which many Ships are expos'd to, by long lying Wind-bound in the *Downs*. To render which Place practicable for large Ships, to go in and out, and to Ride afloat at Low-water, a Canal ſhould be cut for a new Entrance, and two Sluices placed, like as intended at *Rye*; with ſome Works alſo, whereby to continue a Scour let off at Low-water, quite thro' the Sands in a conſtant Channel.

A Second Place which I ſhall name, is *New-Haven* in *Suſſex*, where by the fixing but of one Sluice a little way within the River, to ſcour away the Gravel and Beach, which very much annoy and choak up the Out-fall: And by the fixing alſo two Piers, for maintaining the Entrance right out to the Sea, that Port might be render'd deep; and by reaſon of the Convenience of its Situation, uſeful to the Publick, both in Peace and in War. And the Low-lands on the Sides of that River alſo, in ſome meaſure, be relieved from the Overflowings of the Waters from the Country, when the Bar to their Diſcharge ſhall be removed.

PEMSEY is another Port in the ſame County, lying a little to the Eaſtward of *Beachy-Head*, which but a few Years ſince has been entirely choaked up, and may be laid open and rendred uſeful, with ſome Labour to clear away the Beach, and by the fixing of two Sluices for maintaining the Entrance for large Ships ; or with but one Sluice for ſmall Ships.

I Shall be glad to have the Opportunity of verbally explaining any thing, wherein I may not be rightly underſtood ; and conclude with this Wiſh, namely, That ſufficient Money were but ready for expeditiouſly carrying on the Work which I am engaged in at *Rye*, and an Experiment would ſoon be ſeen of the Uſe of Sluices well and ſecurely fixed. In the mean time, whether the ſame may be acceptable in any other Place, I know not ; but in caſe the Succeſs in any thing I have here deſcribed, be in Doubt, I hope I may be able to find Friends to be Security for my Performance, or to pay back all ſuch Sums of Money as ſhall be expended, in caſe of Failure in any Thing that ſhall be deſired of me to undertake : Or ſhall be glad of doing my utmoſt in any other Manner as ſhall be approved, and deſired of me.

March 22. 172$\frac{4}{5}$.

J. Perry.

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